0·005 m. in breadth at the level of the anterior branchiæ. The crests had entirely disappeared.

These external metamorphoses are accompanied by internal modifications comparable with those observed in the Urodelous Batrachia when passing from the larval to the adult state. The anatomical examination of the hyo-branchial apparatus in the second metamorphosed Axolotl (28th September) proved that the three inner branchial arches had disappeared, the external arch only remaining; and this, deprived of its membranous denticulations and united by an articulation with the thyroid cornu, formed the posterior joint of the latter. Outside this piece the anterior branch of the hyoid is to be seen on each side. The basi-hyal was much developed, and in it, as in the other portions of the hyoid, ossification had commenced.

These unexpected facts would almost lead one to suppose, with Cuvier, that the Axolotls, hitherto regarded as perennibranchiate Batrachia, may be the larvæ of species destined hereafter to take a place in the group of those which undergo a metamorphosis and lose their branchiæ. If this be the case, the individuals with long external branchial tufts which have lived for nearly two years in Paris, and from which these young animals were procured, would only be larvæ, notwithstanding their power of reproduction*. But if this supposition be accepted, how are we to explain the rapid metamorphosis of these animals of eight months old, when the individuals brought to France from Mexico in 1863 have undergone no change except an increase in size?—*Comptes Rendus*, November 6, 1865, pp. 775–778.

On the Multiplicity and Termination of the Nerves in the Mollusca. By M. Lacaze-Duthiers.

Few animals are so richly provided with nerves as the Mollusca; hence, when they are studied anatomically, it is difficult to understand the name of *Apathique* which Lamarck gave to the general group in which he placed them.

I take *Thetys leporina* as an anatomical and histological type. This species presents in its tissues an abundance of nerves surpassing anything that could be imagined from what exists in the higher animals. In a general investigation of its organization I shall indicate in detail the very peculiar arrangement presented by its central nervous system. The only object of the present memoir is to make known the distribution of the nerves in the buccal veil, and their mode of termination in the barbules which fringe the margins of that organ.

It is well known that, around the mouth, the lips of which are produced into a trunk, the *Thetys* has a large funnel-shaped mem-

* M. de' Filippi has found spermatozoids and mature ova in individuals of *Triton alpestris*, which, from the persistence of the external branchial tufts and the imperfection of their palatine dental system, appeared to be still in the larval or tadpole state (Archivio per la Zoologia, tom. ii. pp. 206–211).

branous expansion, bordered by a fringe composed of innumerable tentacular barbules. This veil receives large nerves, which, after issuing from the subœsophageal ganglia or from the cerebrum, divide and subdivide so as to distribute themselves throughout its whole extent. The branches of these nerves at first anastomose in arches, then, having arrived beneath the tentacular filaments of the marginal fringe, they form lozenge-shaped networks or plexuses of inconceivable richness. Delle Chiaje saw these and figured them in part, but very coarsely.

In the angles of union of the anastomoses we most commonly find a ganglionic swelling destined to reinforce the nerves, which would otherwise soon exhaust themselves by their infinite divisions. Upon the meshes of the network, perpendicularly to the surface, nerves arise which penetrate directly into the tentacular barbules. A very remarkable fact is observed in the distribution of these nerves. In proportion as they advance into the tentacle, their subdivisions increase in number, until, in approaching the extremities, the transparency of the tissues is obscured by the quantity of their ramifications; and at the very apex of the tentacle the nervous trunks and their anastomoses become so voluminous and so considerable that observation by transmitted light, without preparation, is very difficult, and the end of the tentacle itself appears blackish.

Greatly multiplied collateral anastomotic branches detach themselves from the central trunk which occupies the axis of the tentacle, unite with each other, forming arches, and often become so slender that it is difficult, if not impossible, to distinguish them in the midst of the fine striæ produced by the cellular fibrillæ.

It would be supposed that the nearer a nerve approached its termination, the more delicate would its branches become. Here quite the contrary is the case, the anastomotic loops are more numerous and thicker towards the extremity, and in this part of the filaments we find hardly any delicate fibres. All the secondary nerves are nearly as thick as the trunk of the principal nerve at its origin. It is true that from place to place, and at nearly all the angles of anastomoses, there are dilatations, or ganglia of reinforcement, in the structure of which nervous cells and ganglionic corpuscles are recognized.

The termination is extremely simple. From the surface of those terminal networks of which the meshes are formed by the large ramifications just mentioned, there rise, towards the extremity, some processes in the form of rounded clubs, which come quite close to the outer surface, and are only separated from it by a thin layer of the fibrous framework of the barbule and an external epithelial layer.

When we examine the nerves of the tentacles, we find that they are formed of a pellicular envelope, and that their contents are a mixture of molecular corpuscles, fine granulations, sometimes small cells, and a gelatinous fluid, forming by their union the medullar portion.

The central masses present very remarkable peculiarities which I cannot indicate here. The nervous cells and elements are enclosed

in pyriform sacs, appended on all sides to a comparatively small central part, from which the trunks of the nerves originate. The cerebrum and the other ganglia, like those of the great sympathetic nerve, present the appearance of small racemes; and if we wish to ascertain the origin of the nerves, it is in the midst of these masses of granules that we must seek it, notwithstanding the difficulty which this presents.—*Comptes Rendus*, Nov. 20, 1865, p. 906.

On a new Kind of Illumination for Opaque Objects under High Powers. By Messrs. Smith, Beck, and Beck.

This method of illumination has been recently introduced by Mr. Smith, of Kenyon College, U. S. * ; the best effect may, however, be obtained by the following exceedingly simple plan :—

Fig. 1.

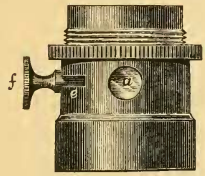

Fig. 2.

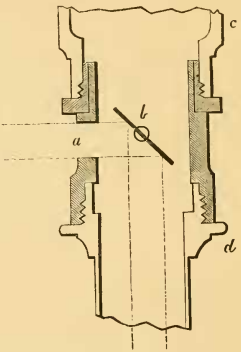

Fig. 3.

A piece of thin glass (*b*), attached to a small brass milled head (fig. 3), fits into the side of an adapter (fig. 1); and when in position, as in figs. 1 and 2, the light coming through a small circular aperture (*a*) may be reflected down and through the object-glass by the thin glass, which makes no obstruction to the rays of light passing upwards again from the object-glass to the eye-piece, nor even affects the definition to any perceptible degree.

The adapter (fig. 1) is used, as shown in section (fig. 2), between the nose-piece (*c*) and the object-glass (*d*); it has a rotating fitting at the milled ring; and this movement, in combination with that of the small milled head to which the thin glass is attached, is sufficient for the nicest adjustment of the illumination. By means of a slot (*e*, fig. 1) in the side of the adapter, the thin glass may be readily removed for the purpose of being wiped, as its perfect freedom from dust or smear is most essential.

* Silliman's Journal, September 1865.